

Exam I

Name \_\_\_\_\_

1. Perform the following operation.

$$(a) \int \frac{x}{\sqrt{1+x^2}} dx$$

$$(b) \int \frac{4x^2}{(1-x^3)^2} dx$$

$$(c) \frac{d}{dx} \int_0^{7x} (4 - \sin^2 u) du$$

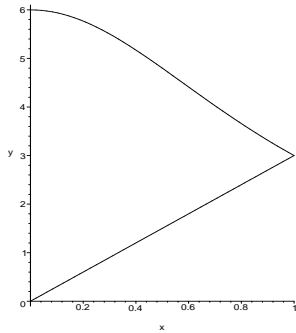
$$(d) \int 3x^4 \ln x dx$$

$$(e) \int (2x - 1)^5 dx$$

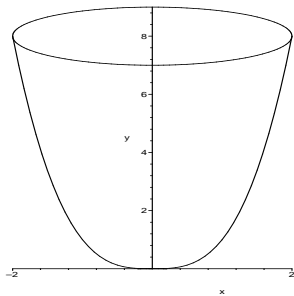
$$(f) \int 3xe^{-2x} dx$$

2. Determine the average value of the function  $y = \frac{1}{1+t}$  on the interval  $[0, 10]$ .

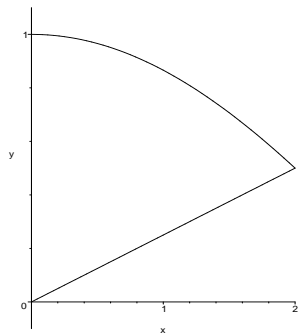
3. Determine the area between the curves  $y = \frac{6}{1+x^2}$  and  $y = 3x$  in the first quadrant.



4. Set up (do not evaluate) the integral for the work to empty a bowl of water ( $62.4 \text{ lb/ft}^3$ ) whose sides map the function  $y = x^3$  and whose upper radius is 2 as shown.



5. Set up (do not evaluate) the integral for the volume of the solid formed by rotating the region bounded by the  $y$ -axis and the curves  $y = \cos\left(\frac{\pi}{6}x\right)$  and  $y = \frac{1}{4}x$  about the  $y$ -axis.



6. Set up (do not evaluate) the integral for the volume of the solid formed by rotating the region bounded by the  $y$ -axis and the curves  $y = \cos\left(\frac{\pi}{6}x\right)$  and  $y = \frac{1}{4}x$  about the  $x$ -axis.

